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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,320	02/07/2002	Shinya Watanabe	Q67357	4591

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EXAMINER

HUYNH, ANDY

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/067,320

Applicant(s)

WATANABE ET AL.

Examiner

Andy Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 28-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☒ Claim(s) 25-27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. In Election/Restrictions Response, Applicants have elected Group I (claims **1-27**) without traverse dated February 27, 2003, in Paper No. 4 is acknowledged. Accordingly, claims **28-36** are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 35 § 1.142(b) and MPEP § 821.03. Applicants have the right to file a divisional application covering the subject matter of the non-elected claims **28-36**, drawn to a method for forming a semiconductor wafer. Accordingly, claims **1-27** are pending in this application.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record as Paper No. 2 in the file on February 7, 2002.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims **1, 14 and 15** are rejected under 35 U.S.C. 102(e) as being anticipated by Arai (USP: 6,528,864 B1).

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Regarding claim 1, Arai discloses in Fig. 2 a chip P2 comprising a planar substrate material/a semiconductor W1, the chip having irregular curve shapes such as concave shape. It is inhering that when the cutting of a semiconductor wafer into chips of concave shapes, the chip is having at least one edge with a concave shape recessed in one direction (see column 1, 20-25, column 3, lines 9-12).

Regarding claims 14 and 15, Arai discloses in Fig. 1 a wafer W1 comprising a plurality of chips P1, where each chip has irregular curve shapes such as concave shape. It is inhering that when the cutting of a semiconductor wafer into chips of concave shapes, the chip is having at least one edge with a concave shape recessed in one direction, wherein the concave shape of the chips that are adjacent to each other and at least partially overlapped with each other (see column 1, 20-25, column 2, line 55-column 3, line 33).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-3, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (USP: 6,528,864 B1) in view of Figures 1-3, Applicants' admitted prior art (AAP).

Regarding claim 2, Arai discloses the claimed invention except for the chip further comprising an arrayed waveguide grating provided on the chip. Figs. 1-2 of AAP teaches that the chips comprising an arrayed waveguide grating provided on the chip. It would have been

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obvious to one of ordinary skill in the art at the time of the invention was made to incorporate an arrayed waveguide grating into Arai's chip's structure in order to construct a wavelength multiplexing/demultiplexing device (see Description of the Related Art of the Specification).

Regarding claims **3, 16 and 19**, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the shape of the chip having the same shape of the arrayed waveguide grating and each of plurality of chips have the same shape, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art.

Regarding claims **17 and 18**, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the shape of each chip is an arcuate shape having two curved-line portions convexed in the same direction, when the cutting of a semiconductor wafer into chips of concave shapes as taught by Arai, the shape of the chip becomes like an arcuate shape that results having two curved-line portions convexed in the same direction. As in Fig. 3 of AAP teaches that the shape of each chip is a funnel shape obtained by dividing in half a rhombus having two curved-line portions convexed in a direction moving away from each other, and in Fig. 2 of AAP discloses that the chips can be arranged at a predetermined spacing and respective end portions of the chips are connected to two mutually parallel straight lines 23.

5. Claims **4-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (USP: 6,528,864 B1) in view of Figures 1-3, Applicants' admitted prior art (AAP) further in view of Higashi et al. (USP: 5,777,386, hereinafter "Higashi").

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Regarding claims **4-6 and 8**, Arai discloses the claimed invention except for the chip further comprising reinforcement means, which is a copper plate and larger than the chip, mounted on at least a narrow portion of the chip. Higashi teaches in Fig. 8 that most of heat generated in the semiconductor device 102 is radiated through the package 100 which is formed with a copper plate and directly in contact with the semiconductor device to improve the heat conductivity between the semiconductor device and the package. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to mount a copper plate, which is larger than semiconductor device, on at least a narrow part of the chip, as taught by Higashi in order to improve the device's heat dissipation (see Higashi, column 1, lines 48-56) and it could also be used to secure the chip for stability.

Regarding claim 7, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the reinforcement means having the substantially same shape of the chip, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art.

6. Claim **9-11 and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Arai (USP: 6,528,864 B1).

Arai discloses in Fig. 2 a chip P2 comprising a planar substrate material/a semiconductor W1, the chip having irregular curve shapes such as concave shape. It is inhering that when the cutting of a semiconductor wafer into chips of concave shapes, the chip is having at least one edge with a concave shape recessed in one direction (see column 1, 20-25, column 3, lines 9-12). Arai does not disclose a second chip having a contour that is substantially similar to the contour of the first chip, and combining means for combining the first chip with the second chip. It

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would have been obvious to one of ordinary skill in the art at the time of the invention was made to form a second chip from a second wafer having substantially same shape as the first chip from a first wafer and to bond the two chips together with any conventional adhesive material and known bonding technique since it was commonly used in the art that involves only routine skill in the art.

7. Claims **20-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (USP: 5,327,517, hereinafter "Yamada") in view of Arai (USP: 6,528,864 B1).

Regarding claim **20**, Yamada discloses in Figs. 9-12 a module/a structure of the guided-wave circuit module comprising a guided-wave circuit chip 1, a box comprising an upper case/holder 41 and a lower case/holder 40, the box accommodating the chip, and a support body/spacer 41a provided in the box (see Yamada, column 9, lines 45-60). Arai discloses in Fig. 2 a chip P2 comprising a planar substrate material/a semiconductor W1, the chip having irregular curve shapes such as concave shape. It is inhering that when the cutting of a semiconductor wafer into chips of concave shapes, the chip is having at least one edge with a concave shape recessed in one direction (see Arai, column 1, 20-25, column 3, lines 9-12).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teaching of a chip having a concave shape and having at least one edge with a concave shape recessed in one direction as taught by Arai into Yamada's module structure to replace the chip with a chip having a concave shape to form the claimed invention in order to make the best use of semiconductor materials (see Arai, column 1, line 11).

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Regarding claims **21, 23 and 24**, Yamada discloses the module comprising the guided-wave circuits having active functions such as guided-wave circuits which make use of refractive index change of the guided-wave circuits due to a temperature change (col. 1, lines 54-57).

Regarding claim **22**, Yamada discloses the module wherein the support body/holder is made of a metal material (col. 19, line 51).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim **12** is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim **12** recites the limitation “the purity level.” There is insufficient antecedent basis for this limitation in the claim **11**.

Allowable Subject Matter

9. Claims **25-27** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant’s disclosure does not teach or suggest the claimed limitations. Yamada et al. (USP: 5,327,517) and Arai (USP: 6,528,864 B1), taken alone or in combination, do not teach or suggest the claimed invention the module wherein the support body further comprises a spring part, the spring part in contact with a portion of the box as recited in claim **25**; the module having

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support body further comprising at least one heat insulating column, the heat insulating column contacting apportion of the box as recited in claim 26; and the module further comprising a buffer agent disposed in an interior of the box as recited in claim 27.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Saito et al. (USP: 6,529,670 B1), Bryan et al. (USP: 6,513,564 B2), Bonn et al. (USP: 6,021,267), Kish, Jr. et al. (USP: 5,661,316), Rosotker (USP: 5,341,024), and Bechtel et al. (USP: 5,223,741) are cited as of interest.

11. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (703) 305-0089. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM. The examiner's supervisor, David Nelms can be reached on (703) 308-4910. The Fax number for the organization where this application or proceeding is assigned is (703) 308-7724. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.



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PRIMARY EXAMINER